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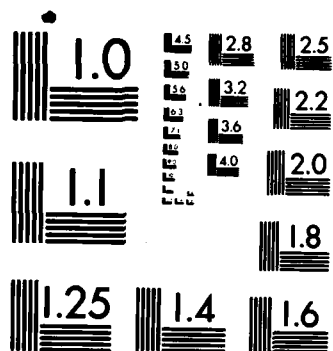
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Materiel System Sustainment Resourcing

by

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Office of the Comptroller of the Army

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Out of the myriad of resource management issues that surfaced as a result of the Army's force modernization program, one in particular has both a very long term impact and wide ranging implications for the Army's process for programing, budgeting, and, most importantly, justifying the funds needed to operate and support its new materiel systems.

When the Army transitioned its first force modernization systems from Full Scale Engineering Development to the production phase, actual production costs greatly exceeded previously estimated costs. For this reason, when the Army was ready to field these new systems, the Army Staff became concerned with the potential for skyrocketing costs for sustaining these same systems. As a result of these concerns and to ensure that the Operating and Support (O&S) elements were in balance with each other, the Assistant Secretary of the Army for Installations, Logistics, and Financial Management tasked the Comptroller of the Army (COA) on 7 April 1983 to develop "a methodology which will ensure that the relative O&S components in the Army programs are resourced in a balanced and understandable manner." This paper describes the COA's efforts to establish sources of actual sustainment cost information in order to accomplish this tasking.

BACKGROUND

Before continuing, however, a brief review of the Army's materiel system Planning, Programing, Budgeting, and Execution System (PPBES) is necessary to put this resource issue in perspective. As shown in Figure 1, the Materiel System Requirements Specification (MSRS) is the first document in the PPBES process. The MSRS is developed by the Deputy Chief of Staff for Operations and Plans in conjunction with the Deputy Chief of Staff for Research, Development, and Acquisition. The document defines the operational requirements for the new system including the expected annual operating tempo. The MSRS is critical to the entire Army PPBES process because it establishes the initial bounds on materiel system costs.

The Baseline Cost Estimate (BCE) uses the MSRS to produce a cost estimate for the life cycle of the new system. The COA is responsible for the development of BCEs, many of which are updated annually. Since the BCE is the first opportunity to associate costs with the new system, it becomes the first formal programing document.

**ARMY PPBES PROCESS
FOR
MATERIEL SYSTEM SUSTAINMENT**

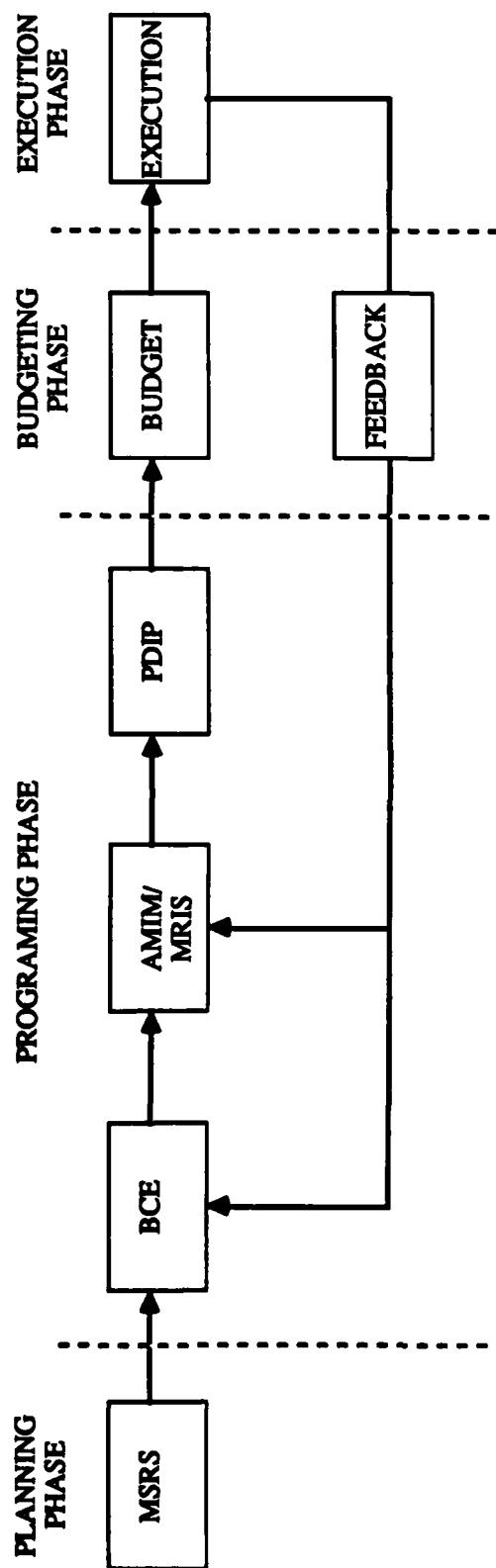


Figure 1

Two other documents form the foundation of the Army's force modernization resource management process. These are the Army Modernization Information Memorandum (AMIM) and the Modernization Resource Information Submission (MRIS). Via the AMIM, the Army Staff annually provides the major commands with the materiel system distribution plans, operating tempo guidance, and O&S cost factors. The major commands use the guidance provided in the AMIM to estimate their resource requirements for sustaining the system during the five program years. These resource estimates are formalized in the major command's MRIS which are used to build the Army's program and, ultimately, the budget.

THE CRITICAL ISSUE - ACTUAL COST vs ENGINEERING ESTIMATES

Up to this point in the PPBES process, engineering estimates have been used to derive materiel system sustainment resource requirements. Engineering estimates which are too high, however, can lead the Army to defer or reduce the fielding of other systems that have a lower priority. Estimates which are too low put a burden on the major commands to sustain the new system within current levels of funding, possibly having to reduce training levels in order to do so.

Once the new system is fielded, the actual costs incurred may or may not reflect the original engineering estimates and, if there is wide divergence between actual and estimated cost, future programs and budgets have to be adjusted accordingly. Capturing actual system O&S costs, however, is easier said than done. Current Army financial data bases are structured around organizations, functions, and mission accomplishment rather than materiel system utilization. These data bases provide execution feedback by appropriation, by unit, and by major command but not the cost to sustain, for example, the M1 tank.

NEW SOURCES OF O&S COST INFORMATION

The lack of an existing financial feedback system for actual sustainment costs led the COA Task Force to search for available alternatives which would be reliable, accurate, and timely. Two existing reporting systems were identified which would, with modification, satisfy immediate requirements. These systems were the Army Sample Data Collection program and the Army Operating and Support Cost Management Information System. A completely satisfactory solution, however, would provide the required cost information on a routine basis through the Army's finance and accounting system. To achieve this longer-term solution, the COA and the Deputy Chief of Staff for Logistics jointly initiated the Logistics/Financial Management Information System Review. The remainder of this paper describes these new sources of O&S cost information for use in the Army PPBES process.

1. Sample Data Collection

In contrast to the Navy and the Air Force, the Army does not operate a comprehensive materiel system maintenance data collection system. Instead, the Army obtains this type of data on a sampling basis through the Sample Data Collection (SDC) program. Standard sampling techniques are used to collect the data which are then used to assess the reliability, availability, maintainability, and durability (RAM-D) characteristics of the materiel system. SDC

programs are established on materiel systems as they enter the Army inventory. SDC was created to provide the Program Manager with the feedback information necessary to ensure that the system performs in an acceptable manner when operated and maintained by troops, but without the burden and other problems associated with a fleet-wide data collection system.

A typical SDC program is that for the M1 tank where all maintenance actions for the tanks in three sample battalions are recorded and analyzed. A contractor representative is assigned to each company in the battalion, another to the battalion motor pool, and one each to the battalion's direct support (DS) and general support (GS) maintenance activities. These personnel collect data on all maintenance actions, both scheduled and unscheduled, which take place on the tanks in the sample battalions. Additionally, all maintenance actions which occur through the general support level on any component removed from the battalion's tanks are recorded. Finally, the type of training conducted by these battalions is compared to the type and number of maintenance actions recorded.

It was believed by the COA Task Force that SDC could be expanded to provide the financial feedback information required by the Army's resource management community. The COA, in conjunction with the Army Materiel Command, initiated the modifications to the SDC program to use the data already collected to produce quarterly O&S Cost Study Reports. These reports provide materiel system sustainment costs to the resource management community in a timely and accurate manner--timely because the reports are published within 60 days after the end of each quarter; accurate because the costs reflect only those parts actually replaced on the materiel system.

The types of information in the O&S Cost Study Reports include:

- usage data (fuel used, miles traveled, hours operated, and main gun rounds fired);
- cost of parts used to repair the system at organizational, DS, and GS maintenance levels;
- cost of parts used to repair recoverable components at organizational, DS, and GS levels;
- number and type of recoverable components evacuated to depot for repair;
- type of training conducted; and
- an analysis of the fuel and parts usage to include predictive consumption rates.

The first quarterly SDC O&S Cost Study Report was published for the M1 tank in August 1984. Similar reports are now being published for the M60A3 tank and the BRADLEY Fighting Vehicles. Reports on 10 other systems will be added in FY86 as these systems are fielded. Additionally, reports will be published for the UH-60A and AH-1S helicopters beginning in January 1986.

2. Army Operating and Support Cost Management Information System

The SDC programs, while providing reliable and timely information, are expensive to operate, limited in coverage, and limited in duration. Another information source was needed to complement SDC. The selected source was the Army Operating and Support Cost Management Information System (OSCMIS) which was developed by the Army in response to the Visibility and Management of Operating and Support Cost (VAMOSOC) initiative of the Office of the Secretary of Defense.

OSCMIS, however, while providing comprehensive cost and usage information on a wide variety of Army materiel systems, lacked credibility within the Army. OSCMIS also reported on cost elements which were not of immediate interest to the Army resource management community. Therefore, a two-phase effort was initiated by the COA to establish OSCMIS credibility and to modify the existing system to concentrate on only those cost elements of interest. Of these two phases, the issue of OSCMIS credibility was of overriding importance and four months of intensive effort by the OSCMIS contractor, Management Consulting & Research, Inc., were devoted to its solution.

Credibility was to be established by showing that the cost and usage data reported by OSCMIS were comparable to similar data reported by SDC, since SDC was perceived by the Army as a reliable information source because of its use of on-site data collectors. Four specific analytical tasks were accomplished relating to the credibility issue using the M1 and M60A3 tanks, the BRADLEY Fighting Vehicles, and the UH-60A helicopter as example systems.^{1/} The results of these tasks showed:

- The materiel system physical configuration (composition) as costed by OSCMIS is identical to the system composition as costed by SDC.
- The parts usage data reported by OSCMIS are proportional to the parts usage data reported by SDC given the difference in fleet sample sizes.
- The parts usage data reported by OSCMIS are a reasonable response to the parts usage data reported by SDC given that OSCMIS reports parts shipments by the Army wholesale supply system whereas SDC reports motor pool parts consumption.
- The parts usage data reported by OSCMIS are related to the materiel system operating tempo data for that same time period.

An example of the types of results achieved is shown in Figure 2 which compares parts usage for the M1 tank. From this figure, it can be seen that the top 10 M1 parts as reported by OSCMIS include nine of the top 10 parts as reported by SDC. The figure also shows that the annual cost of individual parts on a per tank basis is reasonably similar.

^{1/} Lokay, Fred J., et al, Analysis of the Relationship Between Repair Parts Usage and Operating Tempo as Reported by the Army Operating and Support Cost Management Information System (OSCMIS) and Selected Army Sample Data Collection (SDC) Programs, Management Consulting & Research, Inc., 30 June 1985.

TOP 25 M1 TANK PECULIAR REPAIR PARTS

BY DOLLAR VALUE

COST PER TANK

OSCMIS RANK	NSN	PART NAME	UNIT PRICE	QUANTITY	OSCMIS TOTAL \$	SDC RANK	SDC DOLLARS
1	2530010696835	TRACK SHOE ASSY	\$100	167,311	\$13,943	1	\$12,522
2	2530011177942	KIT, SEMIANNUAL	\$1,546	2,330	\$3,002	2	\$3,726
3	2530011177943	KIT, ANNUAL	\$2,367	1,017	\$2,006	3	\$2,141
4	2940010904490	AIR FILTER	\$586	2,760	\$1,348	4	\$996
5	2530010635824	WHEEL	\$291	3,426	\$831	6	\$395
6	2910011249325	INJECTOR, FUEL	\$1,378	538	\$618	7	\$337
7	1015010766739	SERVOMECHANISM	\$10,700	47	\$419	5	\$511
8	2540010729931	SENSOR	\$1,548	273	\$352	10	\$191
9	1015010766741	ELEVATE MECHAN	\$7,219	49	\$295	8	\$324
10	6110010835606	DISTRIBUTE BOX	\$15,406	20	\$257	20	\$87
11	2530011142528	PARTS KIT, TRACK	\$47	4,543	\$177	-	
12	2590010673900	WIRE HARNESS	\$3,210	65	\$174	-	
13	2530010696834	SHOCK ABSORBER	\$1,651	119	\$164	-	
14	2520011182873	KIT, TRANSMN	\$336	570	\$160	27	\$55
15	2990011361206	STARTER	\$591	307	\$151	-	\$30
16	2520010673873	COOLER, TRANSMN	\$1,652	107	\$147	9	\$223
17	2940010882429	PRECLEANER	\$3,254	47	\$127	-	
18	2530010635667	SPACER	\$294	520	\$127	-	
19	3020010656209	SPROCKET	\$461	330	\$127	12	\$119
20	1240010748970	POWER SUPPLY	\$4,469	32	\$119	15	\$100
21	2940011182868	PARTS KIT, FILTER	\$199	707	\$117	-	\$31
22	2530010635665	LINK, ADJUST	\$1,452	91	\$110	-	
23	1240010745766	PERISCOPE	\$833	150	\$104	34	\$37
24	2590010730125	WIRE HARNESS	\$1,538	79	\$101	-	
25	2835011191280	PARTS KIT, FWD	\$1,047	112	\$98	-	

Figure 2

The second phase of the plan to use OSCMIS as a source of materiel system sustainment cost information involved focusing OSCMIS on those things that it does well. The modifications which either have been or will be made to OSCMIS to achieve this new focus include:

- concentrating OSCMIS on repair parts, procurement spares, depot maintenance, and ammunition cost and usage data with the capability to expand to other sustainment cost cells as better original source data become available;
- concentrating OSCMIS reporting on a select number of materiel systems with the capability to expand to include all Army intensively-managed systems;
- creating OSCMIS products that emphasize information, rather than just data, such as cost rates for programing/budgeting and key item drivers for the logistics planners;
- timing OSCMIS reports to support the Army's budget preparation cycle while retaining the capability to produce two OSCMIS reports per year to support both program and budget cycles; and
- converting the OSCMIS cost data base to a form that can provide rapid response to special requests for information as well as be accessed using micro-computers.

3. Long-Term Solution for Sustainment Cost Information

Although both SDC and OSCMIS are acceptable and available sources of materiel system sustainment cost information today, neither is considered satisfactory from the long-term viewpoint. What the Army needs for the long term is improvements in its logistical and financial data systems such that required cost and item information are provided on a routine basis through accounting and logistics reports. This is the objective of the Logistical/Financial Management Information System (LOG/FIN MIS) Review which the COA considers to be the best approach to achieving the Army's materiel system cost feedback needs.

The LOG/FIN MIS initiative is co-chaired by the COA's Director for Resource Management Systems and the Assistant Deputy Chief of Staff for Logistics, with strong involvement of the Assistant Chief of Staff for Information Management (ACSIM). This initiative is oriented towards the following two issues:

- determining the extent to which existing logistics and financial management systems can be quickly modified to provide reliable data for reporting selected sustainment cost information; and
- identifying design objectives for emerging logistics and financial management information systems such that these systems will provide required sustainment cost information as routine output products.

Because of such initiatives as the LOG/FIN MIS review and supported by the integrating efforts of the ACSIM, logistical and financial functional managers no longer have the option of unilaterally designing automated data systems. This new environment now requires the coordination of proposed changes to existing systems, as well as the establishment of requirements for new systems, to ensure the satisfaction of Army, not just limited functional, information needs.

CONCLUSIONS

The actions directed by the COA have ensured that essential feedback mechanisms for materiel system sustainment cost information are either in place or under development. These mechanisms provide the ability to quickly adjust Army programs and budgets for the differences between engineering estimates of O&S costs and the actual costs incurred by systems in the field.

These COA actions have not only established reliable, accurate, and timely feedback mechanisms, they have lent credibility to the Army's resource management decision making and have assisted in the rational allocation of scarce financial resources to meet the Army's needs, goals, and objectives.

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